STATE OF CALIFORNIA
Budget Change Proposal - Cover Sheet
DF-46 (REV 08/16)

Fiscal Year	Business Unit	Department	Priority No.
2017-18	3980	Office of Environmental Health Hazard Assessment	5

Budget Request Name	Program	Subprogram
3980-007-BCP-2017-GB	3730 – HEALTH RISK ASSESSMENT	

Budget Request Description
Well Stimulation Treatment Health and Environmental Risks

Budget Request Summary
The Office of Environmental Health Hazard Assessment (OEHHA) requests $366,000 annually for three years (including $50,000 in contract funding), from the Oil, Gas and Geothermal Administrative Fund, to evaluate chemicals used in oil and gas well stimulation treatments (WSTs) in California. This proposal will fund high-priority scientific work that a recent state report deemed critical to ensuring that hydraulic fracturing and other oil and gas activities can be performed without posing health threats to Californians or degrading the environment. The information developed will enable the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) to implement recommendations of the California Council on Science and Technology (CCST) to identify and restrict the use of WST chemicals that may pose significant health and environmental threats.

Requires Legislation	Code Section(s) to be Added/Amended/Repealed	
☐ Yes ☒ No		
Does this BCP contain information technology (IT) components? ☐ Yes ☒ No *If yes, departmental Chief Information Officer must sign.*	Department CIO	Date

For IT requests, specify the project number, the most recent project approval document (FSR, SPR, S1BA, S2AA, S3SD, S4PRA), and the approval date.

Project No. Project Approval Document: Approval Date:

If proposal affects another department, does other department concur with proposal? ☒ Yes ☐ No
Attach comments of affected department, signed and dated by the department director or designee.

Prepared By	Date	Reviewed By	Date
John Faust	1/9/2017	Allan Hirsch	1/9/2017
Department Director	Date	Agency Secretary	Date
Lauren Zeise, Director	1/9/2017	Matthew Rodriquez	1/9/2017

Department of Finance Use Only

Additional Review: ☐ Capital Outlay ☐ ITCU ☐ FSCU ☐ OSAE ☐ CALSTARS ☐ Dept. of Technology

BCP Type: ☐ Policy ☐ Workload Budget per Government Code 13308.05

PPBA	Original Signed by Ellen Moratti PPBA	Date submitted to the Legislature	JAN 10 2017

Analysis of Problem

A. Budget Request Summary

The Office of Environmental Health Hazard Assessment (OEHHA) requests $366,000 annually for three years (including $50,000 in contract funding) from the Oil, Gas, and Geothermal Administrative Fund, to evaluate chemicals used in oil and gas well stimulation treatments (WSTs) in California. This new project will include the following tasks: (1) Compiling and maintaining an up-to-date inventory of chemicals used in WSTs in California, (2) Screening WST chemicals with respect to the potential health and environmental hazards they pose, (3) Characterizing risks from high-priority WST chemicals, (4) Identifying and filling gaps in scientific information on these chemicals, and (5) Identifying and evaluating potential alternatives for high-hazard WST chemicals. The information developed will enable the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) to implement recommendations of the California Council on Science and Technology (CCST) to identify and restrict the use of WST chemicals that may pose significant health and environmental threats.

B. Background/History

OEHHA's mission is to protect and enhance public health and the environment of California through the evaluation of risks posed by hazardous substances. To carry out that mission, OEHHA devotes significant resources to providing scientific assistance to the State's other environmental and health agencies on projects involving hazard identification, exposure and toxicity assessment, and health and ecological risk assessment.

Oil and gas well operations using well stimulation treatments (WSTs) occur in a variety of locations in California, including the San Joaquin Valley (and frequently in areas close to low-income communities), the densely populated areas of Los Angeles County, and areas along the Central Coast.

Pavley, Chapter 313, Statutes of 2013 (SB 4) required the California Natural Resources Agency to sponsor an independent study on hazards and risks posed by WSTs, including hydraulic fracturing. The study was carried out by the California Council on Science and Technology (CCST). SB 4 also required OEHHA to participate in the study.

Through an interagency agreement with the Department of Conservation in 2014-15, OEHHA assisted CCST with portions of the study related to human and environmental risk, specifically the identification of WST chemical hazards, ways that Californians can be exposed to these chemicals, and development of quantitative screening criteria for ranking these hazards. OEHHA also coordinated public participation activities during the study's preparation. The CCST report was released in July 2015. One of its highest-profile findings – that little is known about the toxicity and risk posed by the many chemicals used in WSTs – was based to a significant extent on information provided by OEHHA. The report recommended that chemicals used in WST activities be limited to those with hazards that are known and acceptable.

Shortly after the report's publication, an interagency working group convened on WSTs to review and implement the CCST report recommendations. This group included the Department of Conservation/DOGGR, OEHHA, CalEPA, the Air Resources Board, the Department of Industrial Relations, Department of Toxic Substances Control, and others. As a result, OEHHA is providing short-term assistance to the Department of Conservation/DOGGR on WST-chemical toxicity issues for its oil and gas well permit decisions. Additional work is needed to more thoroughly assess and understand the health and environmental effects of current WST chemicals, as well as new WST chemicals that may be proposed for use in the future.

The information generated under this proposal will inform the state's long-term efforts to regulate WST operations. More specifically, the information developed by OEHHA will allow for selection of safer alternatives among chemicals that are currently available for WSTs and guide the development of new chemicals to be used for this purpose.

OEHHA received one-time funding to assist with the implementation of SB 4 and the development of the CCST study. OEHHA currently has no resources to devote specifically to follow-up activities relating to WSTs and the CCST report.

Analysis of Problem

Workload History

Workload Measure	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Review and identification of chemicals, chemical mixtures, and inert materials used in WST	NA	NA	NA	80 hours	80 hours	100 hours
Review quantitative health risk assessment criteria	NA	NA	NA	160 hours	NA	NA
Review list of chemicals for which quantitative risk criteria are not available; evaluate potential health hazards	NA	NA	NA	300 hours	NA	100 hours
Fill in toxicity data gaps for selected WST chemicals	NA	NA	NA	NA	NA	200 hours
Categorize chemicals into low and high priority groups based on available data	NA	NA	NA	NA	NA	50 hours
Technical review of draft CCST report	NA	NA	NA	240 hours	NA	NA
Development of conceptual site model for WST to identify sources of contamination, chemical fate and transport in the environment, and exposed populations	NA	NA	NA	300 hours	80 hours	NA
Hazard assessment review	NA	NA	NA	80 hours	NA	NA
Limited technical review of draft CCST report	NA	NA	NA	220 hours	NA	NA
Ongoing input on risk methodology	NA	NA	NA	200 hours	80 hours	100 hours
Public participation: lead the planning and conduct one public workshop	NA	NA	NA	276 hours	NA	100 hours
Project oversight and interagency coordination	NA	NA	NA	120 hours		100 hours
Total hours				*1976 hours*	*240 hours*	*750 hours*

This proposal also requests $50,000 per year for consulting and professional services to supplement staff work related to collecting and analyzing data. This will include consulting with experts at California State Universities on topics related to data analysis. OEHHA also requires additional funds related to consultation on planning public meetings, communicating results, and support the development and distribution of materials related to these findings.

C. State Level Considerations

This proposal is consistent with OEHHA's mission to protect public health and the environment by evaluating the risk of exposure to hazardous substances. It addresses chemical hazards, and air and water pollution issues related to WST activities in California, consistent with the goals of SB 4, which created a framework to regulate well stimulation-related events. It also allows OEHHA to fulfill its responsibilities as a member of the WST inter-agency working group, established by Governor Brown

to address potential health and environmental issues related to WST activities in California. OEHHA will continue to coordinate and provide assistance to the other state agencies within the working group, and particularly with the Department of Conservation/DOGGR, which is the lead regulatory entity overseeing oil and gas production operations in California.

D. Justification

SB 4 required the California Natural Resources Agency to sponsor a study of the hazards and risks posed by WSTs, with the participation of OEHHA. The evaluation, which was carried out by CCST on behalf of the Natural Resources Agency, concluded with a series of recommendations to reduce identified potential health and environmental risks associated with WSTs. OEHHA obtained one-time funding from the Natural Resources Agency to assist CCST in this initial analysis.

The CCST study found that many hazardous and/or insufficiently characterized chemicals are used in hydraulic fracturing: more than 200 chemicals have been reported to be used in WSTs. The report underscored that there has not been a systematic investigation of potential impacts from WST chemicals that are toxic, frequently used, or used in large amounts. In the study, CCST recommended that chemical usage should be limited to an approved list of substances having known and acceptable hazard profiles.

This proposal enables OEHHA, in consultation with other state entities and stakeholders, to conduct an evaluation of WST chemicals (and also to evaluate potentially safer, alternative chemicals) as recommended in the CCST study.

The funding requested in this BCP will allow OEHHA to:

- Provide scientific consulting support to the Department of Conservation/DOGGR regarding chemical hazards and risks from projects involving WSTs
- Develop and expand the inventory of chemicals used in WSTs (expected to be in the hundreds)
- Gather and synthesize data on WST chemicals with respect to potential health and environmental hazards and their potential for human exposure given particular hydraulic fracturing applications
- Identify important gaps in data relevant to determining the health and environmental impacts of these chemicals, and attempt to close some of these gaps
- Identify those chemicals that are likely to pose the greatest risks, as well as potential alternatives that have a less hazardous environmental profile
- Characterize the hazards or risks to human health and the environment from the use of the current and future mix of WSTs used in oil and gas production

OEHHA's expertise in toxicology makes it well-suited to evaluate WST chemicals. As noted above, a number of potentially hazardous WST chemicals are "data-poor" and health-based guidance levels have not yet been defined for them (e.g., via Reference Exposure Levels (RELs) for air exposure, Public Health Goals for drinking water, or occupational exposure limits). OEHHA has the expertise to evaluate the potential for health risks for these chemicals, and will be able, in some cases, to perform assessments of chemicals lacking current RELs. This would also involve characterization of significant gaps in data availability.

As noted above, oil and gas production operations using well stimulation treatments (WSTs) occur in a variety of locations throughout California, including areas of the San Joaquin Valley near low-income communities, the densely populated areas of Los Angeles, and areas along the Central Coast. As such, many California residents live in close proximity to oil and gas production facilities at which WSTs may be used. In addition, numerous oil and gas industry workers also come into close proximity with WSTs.

The health and environmental risks posed by exposure of these populations to WST chemicals is currently unknown, but could be significant. In addition, emission of WSTs to air, water, and land may produce significant damage to ecological resources. The hazard evaluation and risk reduction aspects

of this proposal will provide benefits to these potentially exposed populations as well as California's natural environment.

The project addresses a long-term need for California to identify, characterize, and appropriately control potential adverse health and environmental impacts arising from a major California industrial activity whose chemical-based technology continues to evolve over time. OEHHA's proposal is fully consistent with the purpose of the Oil, Gas, and Geothermal Administrative Fund which may be used for costs associated with WSTs, including scientific studies and rulemaking activities (see Public Resources Code, Section 3401(b)). The proposed scientific analyses will inform regulatory decisions regarding the ongoing use of WST chemicals in California and the selection of safer alternatives.

OEHHA is currently providing the Department of Conservation/DOGGR with immediate assistance regarding specific chemicals that oil and gas operators are requesting to use in their operations. OEHHA is providing this assistance using currently available information on these chemicals. So that WST activities can continue over the long run without posing undue health and environmental risks, OEHHA will need to gather data on WST chemicals, and identify those chemicals that pose significant risks as well as potentially safer, less-risky alternatives.

If the requested resources are not provided, OEHHA would not be able to provide the guidance needed so that WST operations can continue over the long run without posing health threats to residents of neighboring communities as well as the environment.

E. Outcomes and Accountability

With this project, OEHHA proposes to develop new databases, new hazard identification and assessment methods, new risk analyses, etc. In addition, OEHHA will be providing ongoing consultation to the Department of Conservation/DOGGR and other inter-agency participants, as well as organizing various public participation activities related to the scientific analyses.

In the initial two years of the proposed project, OEHHA anticipates working mainly to develop information for the interagency working group's short-term regulatory needs, and will focus on identifying and evaluating high-priority WST chemical hazards. In FY 2019-20, the program will concentrate on determining the toxicity characteristics and potential health and ecological risks of the numerous data-poor WST chemicals currently being used, as well as new substances introduced into the various WST chemical formularies over time. This will involve detailed research and use of a variety of newer scientific methods (e.g. computational toxicology and modern risk assessment techniques).

The objectives/outcomes of the program will be appropriately documented in reports, technical memoranda, electronic database files, and as information resources available at OEHHA's web site.

Projected Outcomes

Workload Measure	2016-17	2017-18	2018-19	2019-20
Toxicology and risk assessment consulting to DOGGR and WST working group	Participate in ongoing working-group activities (50 hours); Provide scientific advice on working-group objectives (50 hours)	Participate in ongoing working-group activities (100 hours); Provide scientific advice on working-group objectives (100 hours)	Participate in ongoing working-group activities (100 hours); Provide scientific advice on working-group objectives (100 hours)	Provide scientific advice on working-group objectives (100 hours)
Develop up-to-date WST chemical-identity and chemical-use database	Obtain data for limited set of chemicals in selected permit applications (100 hours)	Obtain available data; design and populate database (400 hours)	Continue to develop and curate database (200 hours)	Continue to develop and curate database (100 hours)

Analysis of Problem

Identify and collect available toxicity, eco-toxicity, and environmental fate data for WST chemicals	Limited literature reviews for a small subset of WST chemicals (100 hours)	Literature reviews (500 hours); -Develop report describing availability of toxicity data for WST-chemicals (300 hours)	See next item	See next item
Fill in toxicity data gaps for selected WST chemicals	Research and toxicity modeling for selected chemicals in limited set of WST chemicals (200 hours)	Literature research and toxicity modeling (800 hours)	Update toxicity report (300 hours)	Research and toxicity modeling for data-poor chemicals (2000 hours)
Categorize chemicals into low and high priority groups based on available data	Provisional categorization of limited set of WST chemicals (50 hours)	Develop prioritized list of chemicals (200 hours)	Develop updated priority list (100 hours)	Update priority list (100 hours)
Comparative risk evaluation framework and study	Develop initial framework document for WST chemical categorization (100 hours)	Technical memorandum on methodology for assessing the hazard potential of "data poor" chemicals (400 hours)	Risk assessment/ comparative risk assessment of WST chemicals (2000 hours)	Additional risk assessment of WST chemicals 500 hours)
Recommend preferred WST chemicals	NA	Convene expert panel and stakeholder workgroup (300 hours); Propose WST chemical alternatives (200 hours)	Add WST alternative chemicals into comparative assessment (400 hours); Develop list of low-hazard WST chemicals (100 hours)	Continue to develop list of low-hazard WST chemicals (500 hours)
Public participation workshops	Hold 1 or more meetings to obtain input from stakeholders and general public (100 hours)	Hold 2 public participation meetings (300 hours)	Hold 2 public participation meetings (300 hours)	Hold public participation and stakeholder meetings as appropriate (300 hours)
Total hours	*750 hours*	*3600 hours*	*3600 hours*	*3600 hours*

F. Analysis of All Feasible Alternatives

Alternative 1: Approve $366,000 annually for three years, including $50,000 in contract funding.

Pros: Assessment of potential health and environmental impacts due to use of WST chemicals in oil and gas production, based on current OEHHA hazard/risk evaluation methods and state-of-the-art toxicological analysis, will occur.

Cons: Requires additional resources.

Alternative 2: Approve permanent funding from the Oil, Gas and Geothermal Administrative Fund.

Pros: Assessment of potential health and environmental impacts due to the use of WST chemicals in oil and gas production, based on current OEHHA hazard/risk evaluation methods and state-of-the art toxicological analysis, will occur and be funded on an ongoing basis.

Cons: There will be a long-term commitment of expenditures from Oil, Gas and Geothermal Administrative Fund.

Alternative 3: Department of Conservation independently implements the hazard and risk evaluation components of the project.

Pros: No additional resources required from OEHHA.

Cons: Since Department of Conservation/DOGGR does not specialize in toxicology it would likely need to hire a contractor to carry out the necessary project components. Using outside contractors would likely increase the program costs over the course of the project.

Alternative 4: No change.

Pros: No additional resources required.

Cons: The potential for health and environmental harm due to the use of WST chemicals in oil and gas operations would not be adequately characterized and California regulatory agencies would not be able to control or mitigate potentially unacceptable risks to public health and the environment. This would be inconsistent with the goals of the Legislature in passing SB 4, as well as the environmental protection goals of the Governor's office.

G. Implementation Plan

Upon approval of the budget, this proposal would be implemented beginning in July 2017, at which time hiring of the required scientific personnel will be initiated.

Major program milestones over the first two years of the program include:

- Project planning meetings with Department of Conservation/DOGGR and other inter-agency working group members
- Development of a detailed project work plan, including project-specific milestones for data collection, literature reviews, report drafts, key inter-agency and stakeholder meetings, public participation events, and other significant project decision points
- Implementation of first-year activities, mainly focused upon database development, literature review, development of initial priority lists of WST chemicals, identification of data gaps, and public/stakeholder participation activities
- Implementation of second-year activities, mainly involving development of hazard/risk methodology, comparative risk assessment of WST chemicals, and public/stakeholder participation activities

H. Supplemental Information

None.

Analysis of Problem

I. Recommendation

Approve Alternative 1: $366,000 annually for three years, including $50,000 in contract funding, so that the use of WSTs in California's oil and gas industry does not produce significant health and environmental impacts in the coming years, as well as to find less hazardous chemicals for WSTs of the future.

BCP Fiscal Detail Sheet

BCP Title: Well Stimulation Treatment Health and Environmental Risks

BR Name: 3980-007-BCP-2017-GB

Budget Request Summary

	FY17					
	CY	BY	BY+1	BY+2	BY+3	BY+4
Salaries and Wages						
Earnings - Temporary Help	0	187	187	187	0	0
Total Salaries and Wages	**$0**	**$187**	**$187**	**$187**	**$0**	**$0**
Total Staff Benefits	0	91	91	91	0	0
Total Personal Services	**$0**	**$278**	**$278**	**$278**	**$0**	**$0**
Operating Expenses and Equipment						
5301 - General Expense	0	6	6	6	0	0
5302 - Printing	0	2	2	2	0	0
5304 - Communications	0	2	2	2	0	0
5306 - Postage	0	1	1	1	0	0
5320 - Travel: In-State	0	2	2	2	0	0
5322 - Training	0	2	2	2	0	0
5324 - Facilities Operation	0	19	19	19	0	0
5340 - Consulting and Professional Services - Interdepartmental	0	50	50	50	0	0
5346 - Information Technology	0	4	4	4	0	0
Total Operating Expenses and Equipment	**$0**	**$88**	**$88**	**$88**	**$0**	**$0**
Total Budget Request	**$0**	**$366**	**$366**	**$366**	**$0**	**$0**

Fund Summary

Fund Source - State Operations						
3046 - Oil, Gas, and Geothermal Administrative Fund	0	366	366	366	0	0
Total State Operations Expenditures	**$0**	**$366**	**$366**	**$366**	**$0**	**$0**
Total All Funds	**$0**	**$366**	**$366**	**$366**	**$0**	**$0**

Program Summary

Program Funding						
3730 - Health Risk Assessment	0	366	366	366	0	0
Total All Programs	**$0**	**$366**	**$366**	**$366**	**$0**	**$0**

Personal Services Details

Staff Benefits						
5150350 - Health Insurance	0	27	27	27	0	0
5150500 - OASDI	0	11	11	11	0	0
5150630 - Retirement - Public Employees - Miscellaneous	0	50	50	50	0	0
5150900 - Staff Benefits - Other	0	3	3	3	0	0
Total Staff Benefits	**$0**	**$91**	**$91**	**$91**	**$0**	**$0**
Total Personal Services	**$0**	**$91**	**$91**	**$91**	**$0**	**$0**